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EU Enlargement: Benefits of the Single Market Expansion for Current and New Member States

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Contents

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Maryla Maliszewska (born 1973) has been working with the CASE Foundation since 1996. She is the author of papers on the modelling of international trade flows, determinants of the real exchange rate, location of production and agglomeration externalities in transition, as well as the impact of Poland's accession to the EU within a computable general equilibrium framework. In the years 1997-98 and in 1999, she worked as a CASE representative in the ProDemocratia advisory mission in Romania. In 2000 she was employed as a summer intern at the World Bank, where she worked on the empirical assessment of the impact of international trade on employment in Poland. Maryla Maliszewska is a graduate of the University of Sussex (1996) and Warsaw University's Department of Economics (1997). This publication constitutes the fourth chapter of her DPhil thesis entitled "Four Essays on International Trade and Location of Production in Transition Countries" submitted at the University of Sussex in October 2003.

Abstract

This paper evaluates the implications of Eastern EU enlargement with the use of a computable general equilibrium model. The focus is on accession to the Single Market, with explicit modelling of the removal of border costs and costs of producing to different national standards. The results indicate significant welfare gains for the CEECs (volume of GDP increases by 1.4-2.4%) and modest gains for the EU. The steady state scenarios, which allow for the capital stock adjustment in response to higher return to capital, more than double the static welfare gains.

1. Introduction[1]

The aim of this paper is to evaluate the economic implications of enlargement of the European Union (EU) to include the Central and Eastern European countries (CEECs). It is a commonly accepted view that further integration with the European structures will be beneficial to the CEECs in a political and economic sense; however the estimates of the potential economic gains vary widely. Even though the impact of EU accession will be advantageous for the applicant countries as a whole, many sectors will actually see their production decreasing and some employees might see their wages declining in relative terms. The objective of this study is to estimate the scale and nature of the structural adjustments resulting from accession by quantifying its impact on production, employment and wages in different sectors of new members' economies.

The focus is on technical barriers to trade (TBT), as by the end of 2002 all tariffs on manufacturing goods will be removed in accordance with the Europe Agreements. Access to the Single market is defined as adoption of the EU standards and removal of internal borders. Business surveys conducted before completion of the Single Market indicated that simplification of border formalities and harmonisation of product and safety standards were viewed as the most important internal market barriers. The removal of these barriers is therefore likely to be also the major benefit of accession for the CEECs.

The paper is organised as follows. The next section briefly presents previous studies on EU-CEECs' integration and discusses the ways in which this paper contributes to the literature. Section 3 describes the model. The next section discusses the process of enlargement and how it is translated into experiments conducted in this study. Sections 5 and 6 present the static and long run results of the adoption of the Common External Tariff (CET), customs union and Single Market access. The next section includes sensitivity analysis. The last section puts the results of this study into the perspective of the results of existing empirical work.

Finally, a large part of important material was relegated to appendices for the sake of clarity of presentation. Appendix A provides equations, description of the model, parameters and calibration. Appendix B discusses the data on protection employed in this study and compares it with data used in most of the previous computable general equilibrium studies. It also describes the creation of benchmark equilibrium and presents the most important economic features of the regions at the time of enlargement. Appendix C looks at the importance of technical barriers to trade in the EU and in trade between the CEECs and the EU. Appendices are available from the author on request.

[1] I would like to thank my supervisors Professor A. Smith and Professor L.A. Winters; and Dr M. Gasiorek for helpful comments and suggestions. I also benefited from comments received at the GTAP Fifth Annual Conference on Global Economic Analysis in Taipei in June 2002. All interpretations and remaining errors are my own responsibility.

2. Previous studies of EU-CEECs' integration

Most studies conducted so far focus on the economic effects of the eastern enlargement of the EU on the current member states. The implications of the accession for the CEECs are given less attention. A brief discussion of the previous studies is presented below.

Winters and Wang (1994) quantify the expected results of the Europe Agreements focusing on sensitive sectors: iron, steel, clothing and footwear. They conclude that there are substantial gains for the CEECs from this trade liberalisation.

Winters (1994) focuses on the steel industry. Looking at what would have happened if the Europe Agreements (EA) existed in 1992 and allowing complete steel liberalisation, he found out that it would have led to substantial gains for EU consumers, and for CEECs' producers.

Rollo and Smith (1993) use a computable partial equilibrium model to analyse the effects of the EAs, focusing on sensitive sectors. They show that even a huge increase in CEECs' exports of other sensitive products will have a diverse, but not a significant impact on current member states. They also analyse the inclusion of the CEECs into the Common Agricultural Policy (CAP).

Gasiorek, Smith and Venables (1994) model the economic impact of the increased trade with the CEECs on the EU within the computable general equilibrium (CGE) framework. They conclude that even a substantial trade growth will have little influence on the output and welfare in EU countries.

However, the studies by Brown et al. (1995), Baldwin et al. (1997), Francois (1998) and Forslid et al. (1999) focus on the economic implications of the integration for the CEECs. The results of these studies will be discussed in greater detail in the section presenting the results of this study. Brown et al. (1995) use a CGE model to evaluate the implications of Poland-Hungary-Czech Republic-EU integration on economic welfare, trade, output, employment by sector as well as the real returns to capital and labour in the CEECs and the EU. They model the effects of reduction of tariffs and non-tariff barriers (NTBs) and the rationalisation of the production process by capturing scale economies and increasing product variety. The results suggest that as a result of integration the CEECs will experience substantial economic welfare gains. The impact on output, wages and employment in the CEECs is unequally distributed among sectors. In Czechoslovakia and Poland output and employment tend to expand across virtually all sectors. Hungary exhibits a great degree of specialisation with some sectors expanding and some declining.

Baldwin et al. (1997) analyse the implications of the elimination of all trade barriers between CEECs and the EU, adoption of the common external tariff and accession to the Single Market in a CGE framework. According to their estimates, all European regions gain from the enlargement and the CEECs gain much more in relative terms. The authors also model the implications of a decrease of investment risk in the CEECs and increase of their capital stock as a result of accession. When the accumulation effects are taken into account the expected gains for the CEECs are much higher.

Francois's (1998) paper is based on a similar model to Baldwin et al. (1997). It also looks at the impact of free trade between the EU and the CEECs, the reduction in transaction costs and decreased investment risk in the CEECs. However, Francois (1998) decomposes the impact of accession into static allocation, accumulation and pro-competitive effects. This allows him to conclude that major gains for the CEECs come from the accumulation of capital and efficiency gains following the integration of imperfectly competitive industries. Francois (1998) stresses that long run benefits to the CEECs will be connected with deep structural adjustments, as some sectors will see their output decreasing by as much as 90% of the benchmark level.

Forslid et al. (1999) study the effects of increased integration between CEECs and the EU by modelling a 5% fall in import barriers, export subsidies and transport costs. Similar to the previous studies, the results show that further integration between the two regions produces significant welfare gains to the CEECs, while the EU gains are small. Exports from the CEECs are expected to increase across all manufacturing sectors, with production shifting towards labour-intensive products.

The existing research does not provide a comprehensive picture of the implications of accession for the individual applicant countries. The study by Brown et al. (1995) models the implications of free trade area and not accession. In the models of Baldwin et al. (1997), Francois (1998) and Forslid et al. (1999), seven CEECs are treated as an entity and therefore it is not possible to assess the impact of accession on individual countries. Furthermore, the modelling work is based on data from 1992 or older. However, probably the main weakness of the empirical work conducted so far is that it does not include an implicit modelling of the Single Market, but employs the somewhat arbitrary assumption of an across-the-board equal reduction of real costs of trade. The consequences of enlargement for employment and relative wages of manual and non-manual workers are not analysed either.

The above shortcomings must have also led other authors to the conclusion that more research on accession was needed, as a more recent study by Lejour, de Mooij and Nahuis (LMN, 2001) – published only after I started my work – deals with most of the above limitations. This paper looks at the implications of formation of a customs union, accession to the Single market and labour migration. Due to the use of protection levels from the Global Trade Analysis Project (GTAP) database the Europe Agreements form part of the EU accession scenario.[2] The authors estimate the impact of the Single market on trade with the use of gravity equations. LMN (2001) compare the trade intensity between the EU members with two otherwise equivalent countries, which are not members of the EU, to calculate potential trade flows between the EU and the CEECs following the Single market enlargement. Then the potential trade increases per sector are translated into Samuelsonian iceberg trade-cost equivalents of the barriers (non-tariff barriers). The abolition of those non-tariff barriers in the CGE model results in trade flows that correspond to predictions from the gravity model. The derived barriers to trade differ significantly between sectors

[2] The GTAP database does not incorporate the provisions of the Europe Agreements and the Uruguay Round (UR) commitments.

and vary between 0% (Metals, Other Manufacturing, Raw Materials) and 17% (Agriculture). Sectors, where the potential impact of the Single market access on trade is the highest include Trade Services (17.2%), Textiles and Leather (14.5%), Non-metallic Minerals (13.1%) and Transport Equipment (11.4%).

My modelling exercise differs in three major ways from that of LMN (2001). Firstly, I employ the actual pre-accession protection data on trade between Poland, Hungary and the EU based on the World Trade Organisation (WTO) Trade Policy Reviews. Tariff margins are a crucial factor influencing the results of trade policy experiments, therefore the construction of data and definition of policy experiments require careful consideration. Based on the actual protection levels in 1997 and the subsequent tariff liberalisations I simulate benchmark equilibrium at the time of accession.[3] Secondly, I model border and standards costs explicitly as additional transport costs and value added in production respectively, while LMN (2001) employ tariff equivalents of non-tariff barriers. To this end I employ estimates of these barriers in the pre-1992 EU. Finally, I assume imperfectly competitive behaviour in selected sectors, which seems to be a more realistic assumption as to the nature of competitive interactions between firms in several industries.

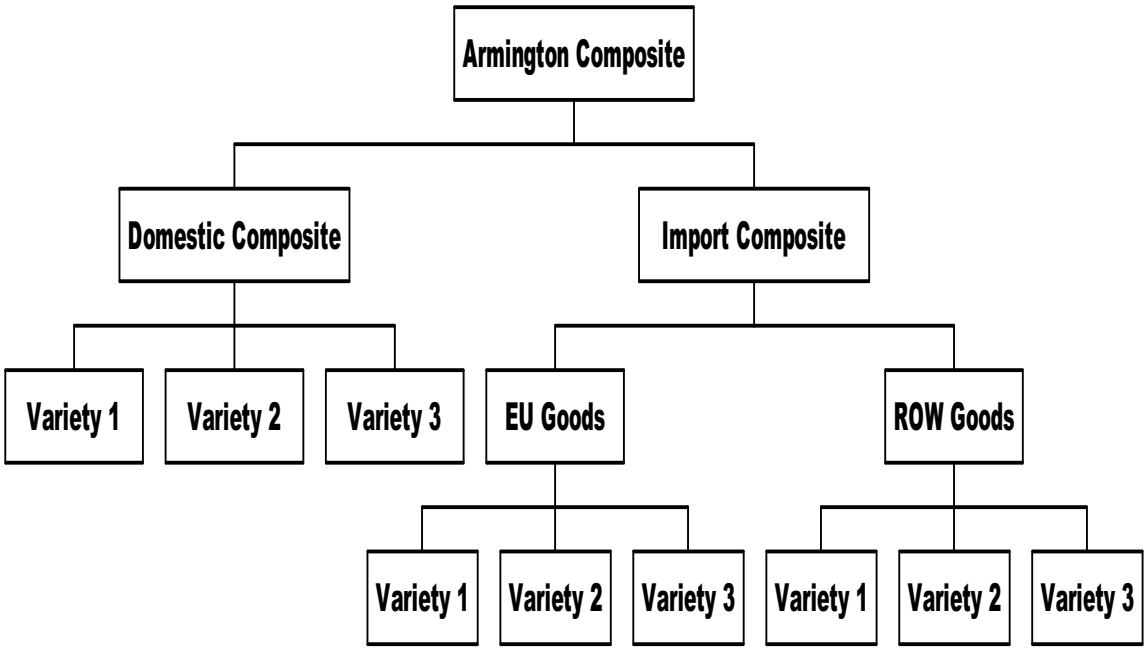
3. The model

The model employed in this study is a standard static computable general equilibrium model. It includes several price-wedge distortions such as factor taxes in production, value-added taxes, import tariffs and export subsidies. Factor taxes in production and value-added taxes remain unchanged in simulations. Production involves combination of intermediate inputs and primary factors (capital, skilled and unskilled labour). We assume a Constant Elasticity of Substitution (CES) function over primary factors and a Leontief production function combining intermediate inputs with factors of production composite. Primary factors are mobile across sectors within a region, but immobile internationally. Each region has a government, whose revenue is held constant at the benchmark level and a single representative consumer. The trade balance is also held constant in counterfactual simulations.

Demand for final goods arises from a Cobb-Douglas utility function. The demand structure is illustrated in Figure 1. Within each region, final and intermediate demands are composed of the same Armington aggregate of domestic and imported varieties. The composite supply is a nested CES function, where consumers first allocate their expenditures among domestic and imported varieties and then choose among imported varieties. In the imperfect competition case firm varieties enter at the bottom of the CES function. This approach allows for the differentiation in preferences for home and imported goods. The special form of this demand structure is firm level product differentiation. It requires the assumption that all elasticities of substitution between firms and products are equal. Demand is then represented by a single level CES function with all domestic and imported varieties competing directly, as illustrated in Figure 2.

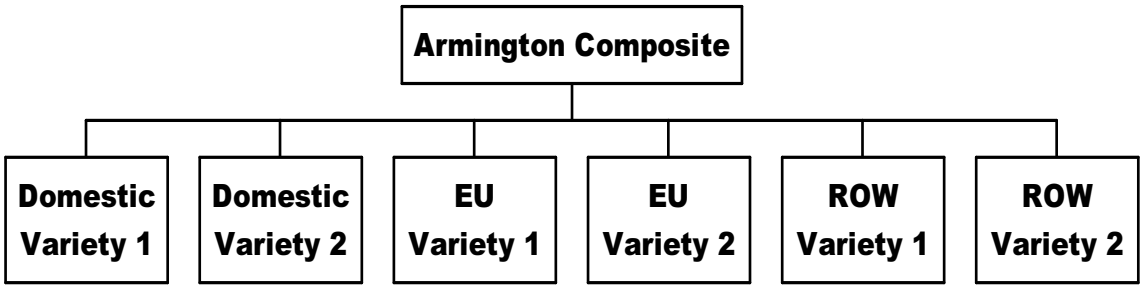
[3] For details see Appendix B.

Figure 1. Demand structure in the IRTS scenario – firm level product differentiation within an Armington aggregate



Source: HRT (1996a).

Figure 2. Armington composite with equal elasticities of substitution for all product varieties



Source: HRT (1996a).

There is strong empirical evidence for modelling selected sectors as imperfectly competitive (e.g. Pratten, 1988). Increasing returns to scale (IRTS) in production are assumed in 15 out of 26 industries. These sectors generate around 40% of value added in Poland and Hungary. Production in IRTS sectors requires a fixed cost and marginal cost is assumed to be constant. Firms act as Cournot competitors and free entry and exit ensures zero profits. Section 3 in Appendix A covers derivation of markup equations and calibration of equilibrium conditions in IRTS sectors, as well as the values of the returns to scale employed.

A detailed description of the model equations, calibration and parameters employed is provided in Appendix A. It is based on the MRT – Multiregional Trade Model – by Harrison, Rutherford and Tarr (HRT) implemented in their evaluation of the impact of completion of the Single Market (HRT, 1994 and HRT, 1996a). The HRT model is modified in the sensitivity section. My application includes fifteen regions and twenty six sectors, of which seventeen are manufacturing industries.

The data originates from the Global Trade Analysis Project Version 5 database, which includes the national and regional input-output structures, bilateral trade flows, final demands pattern and government intervention benchmarked to 1997. The GTAP protection data does not incorporate the preferential trade agreements between the EU and the CEECs (Europe Agreements) and between the CEECs themselves (Central European Free Trade Area, CEFTA). Therefore, the protection data is first updated based on the 1997 applied tariffs and imposed on the initial set of the social accounting matrices (SAMs). Then the impact of further trade liberalisation between 1997 at the time of accession is modelled with the use of a CGE model described above. The resulting set of accounting matrices is referred to as the benchmark.

Appendix B includes a detailed description of trade protection of Poland, Hungary and the EU in 1997 and at the time of accession and differences in protection data employed in this study and as reported in GTAP. These differences are substantial and the use of the updated tariff rates has a crucial impact on the results of this modelling exercise. The following sections of Appendix B present the methodology employed in the creation of the benchmark equilibrium and the main characteristics of Poland, Hungary and the EU at the time of enlargement. The discussion of trade penetration by sectors and differences in factor shares in value added allows for better understanding of the welfare implications of enlargement and its impact on industrial structures.

4. Defining accession.

The admission of CEECs to the EU can be viewed as a three-stage process. The first step is full integration into the customs union with the freedom of movement of non-CAP goods, of services and of capital. The second step is a full integration of the CEECs into the CAP and free movement of labour. The last step is economic and monetary union. Ideally, the quantification of the impact of accession on the CEECs should capture all of the above elements of membership. However, as discussed by Smith et al. (1995) or Mayhew (1998), the accession of the CEECs to the European Monetary Union (EMU) is likely to come at a much later stage of integration. Full integration into the CAP will be preceded by a ten-year transition period, during which prices of agricultural products and income support to producers will be gradually adjusted to the EU level.[4] The modelling of the whole process of accession would be extremely difficult, as it would involve a lot of guessing and forecasting of the long-term developments in the CEECs and the EU. It is therefore sensible to concentrate the modelling effort on the following factors, which will come in the early stages of accession:

- integration into the customs union, which will involve elimination of all remaining tariff and non-tariff barriers to trade and adoption of the Common External Tariff by the CEECs,

[4] The long-term reform of the CAP has been agreed upon and accession negotiations have been concluded, but those issues were not resolved yet when I did my work.

- accession to the Single Market, which will lead to the reduction in real transaction costs as a result of simplification of border formalities, harmonised product and safety standards, similarity of business environment etc.

In what follows I will use the term “accession” to refer to enlargement of the customs union and the Single Market.

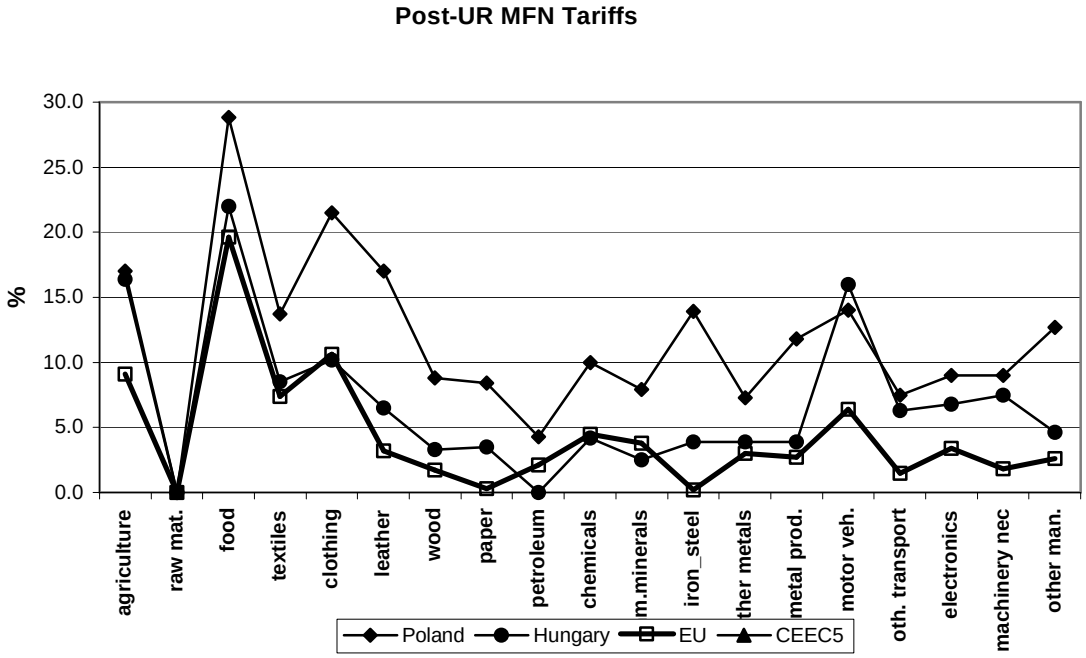
4.1 Formation of the customs union

The first development in formation of the customs union was negotiation of the Europe Agreements (EAs) with the associated countries. Poland signed an Association (Europe) Agreement with the EU in December 1991. The agreement became fully effective in February 1994. The EA aimed to establish a free trade area over a maximum period of ten years. Polish industrial exports have benefited from duty free treatment since January 1995, except for coal, steel and textiles, which were granted duty free access in 1996 and 1997 respectively. Poland eliminated duties on industrial products imported from the EU on 1 January 1999, except for steel and petroleum on which duties were abolished in 2000, and automobiles on 1 January 2002. In the case of agricultural products the EA included reciprocal concessions in the form of reduced tariffs on a number of products and increased quotas (WTO, 2000). Hungary also negotiated its trade agreements with the EU in December 1991. The content of EAs was broadly similar for all associated countries. The EU eliminated the majority of its tariffs on industrial products imported from Hungary by 1992. The tariffs on sensitive products other than textiles and clothing were abolished on 1 January 1995. Duties on textiles and clothing were removed on 1 January 1997 and quantitative restrictions were abolished a year later. As of 1 January 1998 Hungarian goods have enjoyed duty free access to the EU market. Hungary eliminated its duties in two steps i.e. on 1 January 1994 and 1997. Hungary still kept duties on “sensitive” products such as chemicals, textiles and clothing and steel products. The complete elimination of duties on EU industrial imports took place on 1 January 2001. Trade in agricultural goods is also being liberalised in accordance with the EAs and new agreements on reciprocal concessions (see Appendix B for details). The accession itself will lead to complete elimination of the remaining tariffs and non-tariff barriers in trade between the CEECs and the EU.

In addition, the CEECs will adopt the Common External Tariff (CET) applied by the EU in trade with the third countries. After the Uruguay Round (UR) tariff bindings, the majority of Polish and Hungarian duties still exceed those applied by the EU (see Figure 3). The average post-UR tariff for industrial goods weighted by most favoured nation (MFN) imports amounts to 2.9% in the EU, 6.9% in Poland and 6.7% in Hungary (Finger, Ingco and Reincke, 1996). Only the Hungarian tariffs on imports of Clothing, Petroleum, Chemicals and Non-metallic Minerals are lower than the EU tariffs. The protection of Hungary is significantly higher than that of the EU in the case of imports of Motor Vehicles, Machinery and Equipment and Other Transport Equipment. In Poland the same is true in the case of Leather, Iron and Steel, Clothing, Metal Products, Paper and Motor Vehicles. A

significant structural adjustment may take place in sectors where protection will be greatly reduced after the adoption of the CET.

Figure 3. Post Uruguay Round MFN tariffs - simple averages



Source: See section 1 Appendix B.

The next step in the creation of the customs union involves the abolition of tariffs and export subsidies on trade in agricultural and food products between Poland, Hungary and the EU. Tariffs in food and agriculture applied by Poland and Hungary on EU products are much higher than the respective tariffs of the EU. In addition Poland and Hungary are small relative to the EU so they are likely to benefit more than the EU from the abolition of trade restrictions. Of those two, Hungary exports a much larger share of its output (see Table 6 of Appendix B), so it is likely to benefit more than Poland from improved access to the EU market.

4.2 Single Market Access

One of the studies ordered by the European Commission before completion of the Single Market looked at the perception of EC producers as to the importance of barriers to be removed by the formation of the Single Market. It showed that the elimination of physical frontiers, costs and delays, harmonisation of national standards and regulations, and government procurement were the most important barriers to trade before 1992 (see Table 1). Elimination or lessening of these impediments to trade is also likely to bring major benefits to the CEECs when they gain Single Market access. Therefore in modelling the Single Market access I follow HRT (1996a) by focusing on reduction in border costs and delays, as well as reduction in costs of compliance with varying national standards and regulations.

Table 1. Perceived importance of internal market barriers (ranks)

Total industry	EUR12
National standards and regulations	2
Government procurement	1
Administrative barriers	8
Physical frontier delays and costs	3
Differences in VAT	6/7
Regulations of freight transport	6/7
Restrictions in capital market	5
Community law	5

Q: How important do you consider these barriers to be removed?
1 = most important 8 = least important
Source: European Commission (1987).

4.2.1 Border costs

One of the most observable barriers to trade is due to the existence of borders and customs formalities, which involve delays and various kinds of administrative costs. At the moment all goods from the CEECs exported to the EU and vice versa are stopped at the EU border for customs clearance. Following enlargement the customs and fiscal controls in trade with the EU will be conducted directly from firms' offices. However, due to restrictions on the movement of persons in the first years following enlargement there will remain some costs related to the existence of physical borders.

According to Cawley and Davenport (1988, Tables B2 and A3), the unweighted average of the border costs before completion of the Single Market amounted to 1.7 % of the total amount traded. In order to update those figures to the post-Single Market 1997 values, I use the results of the survey from European Commission (1997b). This study includes the results of a large business survey, where firms were asked to evaluate the Single Market's effect on delays at the borders. According to this survey 56% of firms believed that the Single Market had a positive effect by eliminating delays at the borders. I follow Hoffmann (2000) in assuming that the proportion of border costs removed in a given country equals to the share of positive responses from given country firms. Therefore if the initial trade cost amounted to 1.7% and 56% of this cost was eliminated, the post 1992 border cost amounts to 0.75, i.e. 1.7-(1-0.56) = 0.75. This constitutes an upper bound of the possible elimination of border costs as this calculation assumes that for those firms where the Single Market had a positive impact on elimination of border costs, the border costs were eliminated completely. Border costs in all remaining regions of the model i.e. in all countries except for the EU are assumed to be equal to 2%.

Table 2. Border Costs Before and After 1992 in the current member states

Exporter	Border costs before 1992 as a per cent of total exports	Post-1992 border costs
Austria	1.3	0.65
France	1.437	0.632
Germany	1.562	0.687
Greece	1.5	0.75
Great Britain	1.176	0.788
Italy	1.378	0.524
Netherlands	1.441	0.778
Portugal	1.379	0.593
Spain	1.451	0.348
Rest of the EU	1.508	0.329

Source: see text.

Border costs are modelled as additional purchases of a domestic transportation good, which includes shipping, handling and warehousing for customs purchases. With the establishment of the customs union, these costs will be greatly reduced.

4.2.2 Standards costs

The EC has been concerned with the elimination of the technical barriers to trade since its creation. However, the major effort of elimination of barriers to trade imposed by differing national regulations and standards was undertaken with the creation of the Single Market. Appendix C includes a detailed discussion of standards and technical regulations and the importance of those barriers in trade between the EU and the CEECs.

The Single Market measures consist of 2,556 different mandated standards. This number rises to more than 20,000 when voluntary standards are considered. By October 1997 the number of standards approved in all EU member states amounted to only 32% of the total number of mandated standards. The process of implementing standards is slow, as in the survey conducted for the European Commission only 39% of the businessman in the EU believed that the Single Marked had eliminated barriers to trade, while 20% believed that it had no effect (EC, 1997). In 1998 only 25% of the intra-EU trade was free from any technical barriers to trade (Brenton et al. 2001).

HRT (1996a) and Hoffmann (2001) assume that the sum of border and standards costs amounts to 2.5% and calculate the costs of compliance with foreign standards as the residual between 2.5% and border costs discussed above. This approach seems rather arbitrary. I follow a different approach by using the rough numbers from the Cost of Non-Europe study (European Commission, 1988). Based on the extensive interviews of EC firms the costs of obstacles to transborder activity were expressed as a per cent of turnover. One of the obstacles considered

were technical standards. The authors assign to each industry a number between 0 and 4. In this index "0" indicates no costs implied by a given barrier, "1" corresponds to a cost of less than 1% of turnover and indicates that respondents experience a significant but not prohibitive nuisance, and "4" indicates a cost of 3% or more and significant barriers to trade. The resulting costs of standards and technical regulations before completion of the Single Market are presented in Table 3 below (column 3 and 4 are useful in further discussion).

Table 3. Standards cost rate before and after 1992

	Standards Cost Rate in the EU (%)		Exports as a share of total exports (%)	
	1988	1997	Hungary	Poland
Agriculture	2	0	3	1
Raw materials	1	0	3	30
Food	2	0	6	5
Textiles	1	0	2	2
Clothing	1	0	4	5
Leather	1	0	2	3
Wood	1	0.7	2	6
Paper	1	0.3	1	2
Petroleum	1	0	1	2
Chemicals	2	1.2	8	5
Non-metallic Minerals	1	0.7	2	2
Iron, steel	1	0.6	1	3
Other metals	1	0.5	2	3
Metal prod.	1	0.6	2	3
Motor vehicles	2	1.6	10	3
Other transport equipm.	3	1.3	1	1
Electronics	3	2.2	13	2
Machinery n.e.c.	2	0.4	14	8
Manufacturing n.e.c.	1	0.7	2	3
Utilities	1	0.2	2	1
Trade	1	0.4	2	2
Transport	1	0.2	4	6
Financial services	1	0.2	6	5

Source: columns 1 and 2: see main text, columns 3 and 4: pre-accession levels in Table 6 of Appendix B.

These numbers need to be updated to their post-Single Market values. To this end I employ the same methodology as Hoffmann (2001). In evaluating the size of reduction of technical barriers he takes into account two measures. These are the number of ratified standards related to each

directive as a share of the total number of mandated standards[5] and the index of harmonisation of regulations produced by the European Commission (1997c) and discussed in Appendix C. Based on these two pieces of information, Hoffman (2001) produces an estimate for each sector of how far the internal market has reduced the standards costs (see Table 4 for details). The post-1992 level of standards costs is reported in column 2 of Table 3.

In several sectors a full harmonisation is assumed. This is the case of food and agriculture, where the task of harmonising has been going of for many years and where the standards organisations report almost full harmonisation in 1997. This is also true in sectors which are regulated by the mutual recognition principle such as beverages and tobacco, textiles and clothing, leather and others. In the benchmark equilibrium (1997) the costs of technical regulations and standards in CEECs-EU trade is assumed to be equal to the pre-1992 EU values (first column of Table 3).

Table 4. Number of standards implemented in each sector

Sector	Measures	Share of technical barriers removed (%)
Agriculture	Harmonised food regulation	100
Raw materials	MRP	100
Food	Harmonised food regulation	100
Textiles	MRP	100
Clothing	MRP	100
Leather	MRP	100
Wood	None	35
Paper and printing	Packaging and waste directive, European Copyright system	75
Petroleum	MRP	100
Chemicals	Detailed directives and MRP	40
Non-metallic Minerals	CPD	25
Iron, steel	Standards (Construction products (CPD))	35
Other metals		45
Metal products	CPD, Public procurement	45
Motor vehicles	Harmonised regulation	20
Other Transport Equipment	Harmonised regulation and public procurement	55
Electronic equipment	Standards (Machinery Directives)	25
Machinery n.e.c.	Standards (Machinery Directives)	25
Manufacturing n.e.c.		25
Utilities	None	25

[5] The information about sectors regulated by mandated standards is obtained from CEN (1997), CENELEC (1997) and ETSI (1997) and the number of ratified standards as a share of total mandated standards is as of June 1997.

Trade		55
Transport		80
Financial services		80

Source: Hoffmann (2001), Table A2.

The differences in technical regulations and standards, which vary between domestic and the EU markets, require producers to manufacture or package goods in forms, which are different than for their domestic markets. Standardisation costs therefore increase the cost of production for exports and they are modelled as additional value added in each sector where trade takes place. This approach ignores the fixed cost elements of implementation of new standards. However, these are mostly one-off investments and their magnitude is not likely to be significant (see Appendix C for more discussion).

5. Results of the static experiments

There are several reasons why we should expect the enlargement to be beneficial to the CEECs and the EU. The reductions in barriers to trade and transport costs decrease the prices of goods for consumers, as well as prices of intermediates and capital goods for producers. The extent of these gains depends on the amount of trade between the trading partners and the trade creation and trade diversion effects. Apart from increased efficiency of resource allocation, as demand shifts to regions with the lowest cost suppliers, additional gains stem from increased competition. However all gains from trade also involve adjustment costs and may be associated with potentially painful restructuring in the CEECs and significant redistribution effects.

On the export side lower barriers and costs of trade may lead to higher foreign demand for domestic products and therefore higher prices of domestic goods depending on the supply side response. While increased domestic prices have a welfare decreasing effect on domestic consumers, they may lead to an improvement in the terms of trade (TOT), which is a source of potential welfare gain. However, a fall in the prices of imported intermediate goods is likely to result in a positive supply response and a possible fall in prices of domestic goods. So the overall effect depends on the increase in demand for exports and the extent to which domestic consumers substitute imports for domestic goods. The resulting change in the terms of trade cannot be predicted a priori.

In the case of imperfectly competitive industries a further effect on resource allocation can be identified - i.e. the exploitation of economies of scale as fixed costs are spread over a larger output and average costs decrease. When tariffs on imports fall, imports become relatively cheaper and consumers substitute away from domestic products. In the short run when the number of firms is fixed, the demand schedule faced by domestic producers shifts down. Domestic firms lose market share in the home market and have to lower their markups on domestic sales. Unit costs are now higher than price and firms are not able to cover the fixed costs. This results in firms exiting the

industry and output per firm of the surviving firms increasing as they slide down their average cost curves.

In all experiments presented in this paper I model the impact of greater integration with the EU of only Poland and Hungary. The first reason is that the CEECs-5 aggregate contains three countries which are first wave candidates (the Czech Republic, Slovakia and Slovenia) and some which are likely to become EU members at some later stage (Romania and Bulgaria). However the main reason for not including the CEECs-5 is that the data on trade protection of those countries was not available to the author. As in the case of Poland and Hungary there are considerable differences between tariffs reported by GTAP and applied tariffs in 1997. Modelling the impact of accession in the CEECs-5 would overstate the true impact of enlargement if the initial protection data were too high. In concentrating on the implications of enlargement for Poland and Hungary we illustrate the possible impact on the second wave of applicants left outside the EU for some more years. Leaving the CEECs-5 outside the EU in the experiments does not affect the results for Hungary and Poland, as simulations not reported here show there are virtually no spillovers between those regions.

5.1 Adoption of the Common External Tariff

Welfare implications of the adoption of the CET by Poland and Hungary are presented in Table 5. In the IRTS scenario Poland gains 0.27% (equivalent variation as a percent of GDP) and Hungary gains just 0.16%, while welfare changes in other regions are close to nil. Poland experiences larger welfare gains, because its external tariffs are much higher than those of the EU and so there are more efficiency gains to be reaped. The welfare impact of the adoption of CET is not big, because trade with the rest of the world (ROW) accounts for less than one third of total trade of Poland and Hungary. In addition the adjustments in sectoral outputs are also modest.

Table 5. Welfare effects of the Customs Union (equivalent variation as a percent of GDP):

	Common External Tariff		**CEt and free trade in cap goods**	
	CRTS	**IRTS**	**CRTS**	**IRTS**
EU15	-0.01	-0.01	0	0
Austria	-0.006	-0.007	0.001	0.007
Rest of the EU	-0.01	-0.011	-0.006	0.002
France	-0.004	-0.004	-0.003	-0.001
Germany	-0.011	-0.012	-0.002	0.005
Great Britain	-0.006	-0.004	-0.004	0
Greece	-0.004	-0.003	0.001	0.008
Portugal	-0.005	-0.004	-0.008	-0.007
Spain	-0.005	-0.005	-0.004	-0.001
Italy	-0.007	-0.006	-0.006	-0.001

Netherlands	-0.013	-0.013	-0.005	0.017
Hungary	**0.114**	**0.161**	**1.585**	**1.717**
Poland	**0.237**	**0.27**	**0.96**	**1.031**
CEECs-5	-0.005	-0.007	-0.031	-0.031
Former Soviet Union	0.004	0.004	0.003	0.002
Rest of the World	0.004	0.008	0.002	0.006

Source: Model simulations.

Table 6 reports the sectoral impact of the adoption of the CET in Poland and Hungary. Output changes in all other regions are very small, only in few cases exceeding 1%. Following the adoption of the CET goods from the ROW become relatively cheaper compared to domestically produced goods. ROW exports of agricultural and food products to Poland and Hungary increase substantially. As a result domestic production in those sectors falls, except for food in Hungary, where the production increases slightly due to lower agricultural prices. Increased competition on a domestic market coupled with cheaper intermediate inputs reduces the prices of most manufacturing goods in Poland and Hungary. Lower prices raise demand for Polish and Hungarian products abroad and lead to production and exports expansion. In Poland sectors enjoying significant production expansion include Other Metals, Iron and Steel, Wood, Motor Vehicles and Clothing. In Hungary major expansion of output is recorded in production of Electronic Equipment, Motor Vehicles, Machinery and Equipment. These are mainly sectors where the share of exports in production and tariffs' reductions following the imposition of CET are the highest.

Table 6. Sectoral effects (relative changes in output) of the adoption of the CET and in the customs union scenarios (IRTS scenario).

	CET		**CET and Free Trade in CAP Goods**					
	Hungary	**Poland**	**Hungary**	**Poland**	**France**	**Germany**	**UK**	**Italy**
Agriculture	-1.1	-1.9	15.7	1.4	-0.2	0.4		-0.2
Raw materials	0.2	0.5	-9.1	-1.4	0.3	-0.1		0.1
Food	0.5	-1.3	53.3	13.6	-0.7	-0.6	-0.3	-0.3
Textiles	-0.5	0.4	-9.7	-5.2	0.1	-0.3		-0.1
Clothing	-0.6	1	-14	-5.3	0.1	-0.4		
Leather	-1.3	-3.7	-14	-7.5	0.1	-1.1	-0.1	-0.3
Wood	-0.4	1.5	-9.2	-3.9	0.1	0.2	0.1	0.1
Paper	-0.5	-0.4	-4.8	-1.7		0.1		
Petroleum	-0.5	0.1	-1.5	-0.5				
Chemicals	-0.7	-0.3	-7	-3.6	0.1	0.2		
Non-metallic Min.	-0.1	0.4	-6.5	-2.8	0.1	0.1		0.1
Iron, steel	0.3	1.7	-6	-3.9	-0.1	-0.2		0.1
Other metals	-0.1	3.7	-8.9	-2.1	0.2	-0.1	2.1	0.4
Metal products	-0.2	-0.3	-8.3	-4.2	-0.1	-0.1		0.2

Motor vehicles	3.4	1.9	-2.8	-0.4	-0.1	-0.2		-0.1
Other transport equipment	1.2	-1.4	-6.9	-4.3	0.2	0.5	-0.1	-0.1
Electronics	3.7	-0.9	-3.5	-4.7	0.1		-0.1	
Machinery n.e.c.	2.3	0.1	-7.6	-4.3		-0.1		0.2
Manufact. n.e.c.	-1	-1.6	-6.9	-3.8		-0.1	0.1	0.1
Utilities	-0.2		-1.1	-1				
Construction	0.4	0.4	1.2	-0.3				
Trade	0.1		0.3	-0.3				
Transport	1.2	0.1	0.2	3.1	0.1	0.2		0.1
Financial services	-0.2	0.1	-2.1	-1.5				

Note: Sectors in bold are subject to IRTS. Source: Model simulations.

Table 5 also presents welfare implications of the adoption of the CET under the assumption of constant returns to scale (CRTS). The differences in welfare implications between CRTS and IRTS are very small in this experiment. As already noted above, the additional gains arise from rationalisation in the use of fixed costs and a decrease in consumption deadweight loss due to lower markups. Output changes under CRTS (not reported here) have the same sign as under the assumption of IRTS, but the magnitude of output changes under IRTS is generally larger in absolute terms. Therefore it seems that traditional determinants of resource allocation, factor intensities and taxes play a crucial role in influencing industrial structures. Shifts in relative costs that occur in CRTS provide an impulse for output fall or expansion. If policy changes lead to expansion of output in a given sector, then under IRTS this results in a decline of average cost and price with output expanding even further.

5.2 Impact of the Customs Union

As mentioned above, the Europe Agreements provide for the complete elimination of protection in trade in manufacturing goods by the time of accession. Therefore the second scenario looks at the implications of formation of the Customs Union, where in addition to the adoption of the CET by Hungary and Poland barriers to trade in food and agricultural goods between the EU and Poland and Hungary are eliminated. In the IRTS scenario the expected welfare gains increase to 1.7% of GDP in Hungary and 1% of GDP in Poland (see Table 5). Protection levels in food and agriculture are very high in the benchmark equilibrium (see Appendix B). In addition all countries provide export subsidies in agriculture and food processing, with EU export support being the highest (GTAP, 2001). Therefore, the abolition of all barriers to trade results in major changes in output of agricultural and food products (see Table 6).

In Poland, the substantially lower tariffs on agricultural goods from ROW result in much higher imports from this region and only a small increase in production of agricultural goods. In addition, since only a small share of output is exported, sales to foreign markets cannot provide a significant

boost to domestic production. In Hungary, which had initially lower tariffs on ROW imports in agriculture and exports a large share of its output to the EU, the situation is quite different. Here better access to the EU market leads to a significant increase in production of agricultural products. However, the production of food rises in both countries, as in addition to better access to the EU market, the prices of major inputs - i.e. agricultural goods - fall significantly. Again the rise in food production in Hungary is much higher than in Poland, because Hungary exports a large share of its output to the EU and has a positive trade balance with the EU in this sector.

As a result of the adoption of the CET the protection of manufacturing goods falls and imports from the ROW become relatively cheaper. This exerts downward pressure on the prices of manufacturing products in Poland and Hungary. Lower prices of manufactures should lead to an increase in exports, but expanding food and agricultural sectors attract factors of production away from industry leading to a fall in production of all manufacturing goods. The transport sector enjoys a modest increase in output due to rise in trade flows, which increases demand for transportation services.

In most EU countries the impact on production is almost negligible. However, France, Germany and Italy record a small increase in production of Other and Transportation Equipment and the UK increases production on Non-Ferrous Metals. Exports from these countries to other EU members replace imports from Poland and Hungary.

This scenario seems too extreme, as with output quotas imposed by the EU on new member states, food production in Poland and Hungary will not be allowed to expand by 14%-53%. In addition the marketing ability of the CEECs' producers and the quality of food products will severely limit the ability of expansion of Polish and, to a lesser extent, Hungarian food sales in the EU. One more significant factor, which will hamper such an expansion of exports of agricultural and food products of Poland and Hungary to the EU, is the fact that the price advantage of CEECs' products has been eroded significantly since 1997. Not only are domestic prices rising with increasing domestic support, but also the real appreciation of national currencies also increases the prices of Polish and Hungarian products in euros.

Negotiations on quotas on production, direct payments to Polish and Hungarian farmers and the conditions of the market access between the candidate countries and the EU were still not concluded when this analysis was conducted. However, given the focus on manufacturing and therefore the level of sectoral aggregation chosen for this model it would have been impossible to incorporate the most important elements of the CAP for agricultural and food products. However, the results of the customs union scenario provide a rough estimate of possible implications of the abolition of protection on CAP products and the tremendous pressures within the CAP.

5.3 Impact of the Single Market

This section presents the implications of the elimination of border and standards costs. Border costs are similar to import tariffs, because they also raise the price of exports in the foreign market. Therefore a decrease in border costs has a similar impact on integrating regions as a tariff reduction. It leads to trade creation and trade diversion and changes in the terms of trade. It also affects the incentives to invest. There are, however, two major differences as compared to the impact of tariffs. The first is that border costs do not generate any revenue to the government and their reduction leads to terms-of-trade gain. A bilateral reduction of these costs may lead to TOT gains in both regions. As border costs are included in the *cif* price of imports, but not in the *fob* price of exports, a reduction in border costs raises the price of exports relative to the price of imports. The second difference is that border costs are symmetric, so that their reduction induces fiercer competition on the home market and a better competitive position on the foreign market. This is also the case of standards costs. They increase the cost of production for exports and their reduction simultaneously improves home country firms' positions in foreign markets and exposes them to more intense competition at home.

In the Single Market scenario I look at the implications of a symmetric reduction in border and standards costs between Poland, Hungary and the EU. The impact of accession on the costs of compliance with national standards and regulations requires more discussion. Most foreign companies that invested in the region already incorporate the necessary requirements. This is also the case of producers already exporting to the EU, whose products already comply with EU regulations. For those firms accession to the internal market is likely to reduce the costs of compliance due to greater availability of the conformity assessment centres in the home countries and greater competition between them. The Union has begun to sign European Conformity Assessment Agreements with the associated countries. These agreements establish that the CEECs can propose conformity assessment centres and testing laboratories for particular product groups for testing by EU experts, with a view to their acceptance by the EU as registered assessment centres. Products declared as complying with national standards in these home based centres will be allowed to be traded within the internal market. This is likely to shorten the time required to obtain a declaration of conformity with national regulation and lower the costs of this process. In addition, products approved for sale in the EU could be also exported to other new member states without any additional certification.

On the other hand, for small Polish and Hungarian firms which have been producing only for domestic market, the introduction of EU regulations, in some cases stricter than domestic regulation, may impose additional investment. A certain part of this investment will be undertaken in the normal course of replacing existing equipment over the coming years. However, in some cases the costs of compliance may be significant, e.g. in the dairy industry. A study of a small sample of manufacturing firms was conducted by the Polish research institute (IKCHZ, 2002). It

indicates that firms that already comply with the EU regulations needed between 6 months to 3 years to obtain necessary certificates and adjust production processes. The estimated costs of compliance amounted to about 0.5%-2% of the firms' annual sales. The small and medium firms which do not comply yet with EU regulations will also benefit from the establishment of the network of conformity assessment centres and lower costs of getting products certified in conformity with national regulation. Despite significant costs, the small firms are likely to benefit most from the ability to export to the enlarged EU, as three quarters of small firms declare that foreign standards and technical regulations are the major barriers to their exports to the EU. In addition they will be able to place their products on other CEECs' markets without any additional costs due to the uniformity of regulations.

Overall, it seems likely that all firms will experience some reduction in standards costs. This was certainly the case of the EU firms with completion of the internal market. In the business survey of several industrial sectors, commissioned by Eurostat as a part of the 1997 Single Market Review (European Commission, 1997b), between 23.6% and 48.8% of respondents in various industries replied that the Single Market has decreased the costs of testing and certification. A much smaller number of respondents believed that the Single Market increased the costs of testing and certification. This answer was given by between 3.5% and 12.3% of firms from different industries, with the exceptionally high share of 21.8% in case of manufacture of office machinery and computers, where 40.7% of firms believed to the contrary. So overall in all industries the majority of respondents declared that their standards cost have fallen. This is also what I believe will happen in case of Polish and Hungarian firms with the EU accession.

At the same time, EU firms will benefit from harmonisation of standards and regulations in the CEECs, as they will no longer need to alter their products in order to comply with the national regulations. Since I do not have any prior expectations as to whether the EU firms will be gaining better access to the CEECs' markets at a faster pace or not, I simply assume that reductions in border and standards costs are symmetrical in terms of fraction of costs being dismantled as a result of the Single Market. I study the impact of reduction of these costs by 25, 50, 75 and 100%.

Table 7. Welfare effects of elimination of border and standards costs (equivalent variation as a percent of GDP)

	ACC25	ACC50	ACC75	ACC100	ACC25	ACC50	ACC75	ACC100
	CRTS				IRTS			
EU15		0.01	0.01	0.02		0.01	0.01	0.02
Austria	0.014	0.029	0.046	0.064	0.017	0.036	0.056	0.079
Rest of the EU	0.004	0.008	0.013	0.018	0.004	0.009	0.014	0.02
France	0.001	0.002	0.004	0.005	-0.001	0.001	0.002	0.003
Germany	0.006	0.014	0.022	0.031	0.006	0.015	0.025	0.036
Great Britain	0.001	0.003	0.005	0.007	0.002	0.004	0.005	0.007
Greece	0.004	0.006	0.009	0.013	0.004	0.007	0.01	0.014
Portugal	0.002	0.003	0.004	0.005	0.002	0.002	0.003	0.003

Spain	0.002	0.003	0.005	0.007	0.001	0.003	0.005	0.006
Italy	0.001	0.004	0.008	0.011	0.004	0.007	0.011	0.015
Netherlands	0.005	0.011	0.017	0.024	0.006	0.012	0.019	0.026
Hungary	**0.473**	**0.975**	**1.508**	**2.074**	**0.537**	**1.108**	**1.717**	**2.367**
Poland	**0.277**	**0.571**	**0.881**	**1.208**	**0.313**	**0.643**	**0.991**	**1.358**
CEECs-5	-0.013	-0.026	-0.038	-0.051	-0.015	-0.028	-0.041	-0.054
FSU	-0.004	-0.007	-0.009	-0.012	-0.005	-0.008	-0.011	-0.014
ROW		-0.001	-0.001	-0.002	0.001	-0.001	-0.002	-0.003

ACC25 – 25% reduction in border and standards costs
ACC100 – 100% reduction in border and standards costs
Source: Model simulations.

A complete reduction of the border and standards costs is quite unrealistic. In the case of standards costs, the Single Market has not eliminated completely differences in national regulations (see also Appendix C), so it is quite unlikely that accession will lead to full elimination of these costs for the CEECs. With border controls on the movement of people and perhaps CAP goods in place during transition period, border costs will neither be completely eliminated as a result of accession. It is also possible that there exists some level of border and standard cost below which these costs cannot be reduced any further, as engaging in exports might be always slightly more costly than production for domestic market. Therefore the AC100 (complete elimination of border and standards costs) presents the upper bound of the possible welfare gains, however the gains of this magnitude may not materialise. Table 7 presents welfare implications of the Single Market access.

The impact of the Single Market by far exceeds the impact of adoption of the CET. Consecutive elimination of border and standards costs leads to gains proportionate to the size of reduction. When production for exports becomes equally costly as domestic production the expected welfare gains amount to 1.7% of GDP in Hungary and to 1.1% in Poland. There are two reasons while Single Market access generates much higher welfare gains as compared to the adoption of the CET despite the fact that the magnitude of border and standards costs is much smaller than the level of external tariffs of Poland and Hungary before accession. The major difference is that the CET applies to a much smaller amount of trade, as trade with the EU accounts for roughly 70% of Polish and Hungarian trade flows. Secondly, access to the internal market involves reduction of real costs of trade for all trading partners, while tariffs reflect distortions in relative prices accompanied by government revenue.

The gains from Single Market access are higher for Hungary than for Poland. This is because standards costs are higher in sectors where Hungarian comparative advantage lies (see Table 3). The highest standards costs are recorded in sectors which account for the highest share of Hungarian exports. This is the case of Electronic Equipment, Machinery and Equipment and Motor Vehicles. Also, Hungary is much more open than Poland so that a larger share of its trade is affected by the removal of NTBs (see Tables 6 and 7 in Appendix B).

Among the EU countries the major gains are recorded in Germany, Austria, Netherlands and Italy. These are the member states that trade most with the CEECs. The regions left outside the increasing integration zone suffer slight welfare losses due to trade diversion. As products from Poland and Hungary face improved access to the EU market, their major competitors from CEECs, the Former Soviet Union (FSU) and ROW are put at a disadvantage.

Finally, Table 8 presents the sectoral implications of the Single Market access. To restate, the reduction of border and standards costs leads to fiercer competition at home and better access to foreign markets. This via various linkages of consumption, investment and intermediate input demand affects production structures of the countries involved. The lowering of real costs of trade reduces the prices of intermediate inputs, decreasing the costs of production. The resulting changes in factor prices further affect the costs of production. The overall effect depends on trade intensity of sectors, input-output linkages and comparative advantage of regions.

Output of several sectors increases substantially as a result of Single Market access. This is at the expense of most service sectors, Raw Materials, Paper, Chemicals and Non-metallic Minerals. In Hungary the highest increase is recorded in Electronic Equipment and Motor Vehicles. These are export-oriented sectors, where exports account respectively for 82% and 72% of production. In addition initial standards costs are relatively high in those sectors, so that their reduction generates greater incentives for export expansion. In these industries the impact of better access to the EU market outweighs the negative impact of increased competition at home. This is also the case of Other Metals, Motor Vehicles, Clothing and Textiles in Poland.

Output in most service sectors in Poland and Hungary falls. This is due to two factors. Real trade costs in services are low - i.e. 1% - and trade in these sectors is rather small, so there are few incentives for output expansion. In addition, as a result of strong expansion of some manufacturing industries, factors of production move away from services. The impact of the Single Market on these sectors is therefore determined by input-output linkages and relative profitability. As the overall GDP level increases, some expansion is recorded in selected service sectors such as Construction and Trade.

Table 8. Output changes in selected countries resulting from a 50% and 100% reduction in border and standards costs (IRTS scenario)

	ACC50		ACC100				
	Hungary	**Poland**	**Hungary**	**Poland**	**Austria**	**France**	**Germany**
Agriculture	-0.1	-0.2	-0.1	-0.4	-0.1	-0.1	0.2
Raw materials	-2.5	-0.1	-4	-0.4	-0.2	-0.1	-0.1
Food	0.9	0.1	1.8	0.2	0.1		
Textiles	0.4	2.2	0.3	5	0.7	0.1	0.6
Clothing	1.2	5.3	1.3	11.1	0.7	-0.1	0.1
Leather	2.1	0.2	3.4	0.6	0.1	0.1	0.8
Wood	1.1	1.9	2.3	3.9	-0.4	-0.1	-0.1
Paper	-1.1	-2.1	-2.4	-4.1	0.3	0.1	0.2

Petroleum	0.1	-0.8	0.4	-1.6	-0.1	0.1	0.2
Chemicals	-2.2	-1.7	-4.6	-3.3	0.6	0.1	0.2
Non-metallic Min.	-1.6	-0.9	-3.7	-1.8	0.1	0.1	0.1
Iron, steel	3.3	1.3	7.1	2	-0.2	-0.2	-0.1
Other metals	5.7	5.7	12.1	8.9	0.4	-0.2	-0.1
Metal products	1.7	1	3.6	1.5	0.1	-0.1	-0.1
Motor vehicles	17	6.5	38.6	14.7	-0.2	-0.3	-0.1
Other transport equipment	9.8	2.1	21.7	4.3	1.3	0.1	0.4
Electronics	17.4	4.5	39.6	10.4	2.7	-0.2	-0.1
Machinery n.e.c.	10.8	1.4	23.4	2.9	0.3	-0.1	-0.1
Manufacturing n.e.c.	-0.6	0.3	-1.6	0.3	-0.1	0.2	0.1
Utilities	-0.7	-0.1	-1.1	-0.2			
Construction	1.3	0.6	2.7	1.3	0.1		
Trade	0.1		0.3	0.1			
Transport	-1.6	-0.5	-3.6	-1.3	-0.4	-0.1	0.1
Financial services	-1.1	-0.7	-2.4	-1.4	-0.1		
Public administration	-0.3		-0.6				

Source: Model simulations.

Table 9 presents the impact of Single Market on factor rewards in Poland and Hungary. The returns to factors in the EU do not change except for a 0.1% rise of wages of both types of workers in Austria and 0.1% rise of land rent in Netherlands and a 0.1% fall in wages of unskilled workers in Portugal. In Poland and Hungary all factors benefit from accession to the internal market. Relative wages of unskilled workers increase as production expands in unskilled labour-intensive sectors. The return to capital rises more in Hungary than in Poland, because the Single Market access leads to expansion of capital-intensive sectors in this country.

Table 9. Impact of the Single Market access on factor rewards (% changes) – ACC100, IRTS scenario

	Hungary	**Poland**
Land	2.6	1.4
Skilled Labour	3.2	2.1
Unskilled Labour	3.7	2.3
Capital	3	2

Source: Model simulations.

In several EU countries output changes are very small (less than 0.5%) and therefore not reported in Table 8. This is perhaps not surprising, as the Polish and Hungarian markets are relatively small for the EU countries so the potential gains from reduction in real costs of trade are not big. In addition the expansion of those sectors in the CEECs reduces imports from the EU. The

expansion of Electronic Equipment and Machinery and Equipment in Austria is due to higher investment demand in Poland and Hungary.

6. Steady state scenarios

The calculation of steady state growth effects follows HRT (1996a). In the above scenarios the price of capital was allowed to vary within each country, while capital stock was held constant. In the steady state scenario capital stock in each country is allowed to adjust, while the price of capital in each country is held constant. This approach is in the spirit of the equilibrium concept in multisectoral planning models as proposed by Hansen and Koopmans (1972) and Dantzig and Manne (1974). It assumes that there exists an invariant capital stock equilibrium. It is defined as a set of prices, production and investment levels for which the economy is able to grow at a steady rate with constant relative prices.

I follow HRT (1996a) by defining the optimal capital stock as the capital stock such that the cost of investment, including depreciation and interest, is exactly equal to the capital rental rate. However, the commodity composition of investment is not modelled explicitly. Instead I use the assumption that the price of capital within each region is equal to the price of a basket of consumption goods. Further, it is assumed that given the return to capital in benchmark equilibrium, the capital stock in each country is optimal. The steady state calculation fixes the price of capital and allows the capital stock to find an endogenous level.

This approach provides an upper bound of the potential welfare gains as it ignores the adjustment costs and foregone consumption necessary to increase investment. For sufficiently high discount rates the costs of forgone consumption could overturn the benefits of capital accumulation. Baldwin (1992) suggests that that the welfare effect is much smaller than the output effect for this component of the gains. Although in the steady state scenarios we continue to measure welfare as equivalent variation as a share of GDP, it has to be born in mind that incorporation of the cost of the investment required to build up the capital stock may substantially reduce the estimates of welfare gains cited below. On the other hand our approach does not incorporate the potential gains due to productivity improvements or endogenous growth theory “learning by doing” effects.

Given that in the static scenario the return to capital in the CEECs increases as a result of accession, the capital stock in this region is no longer optimal and expands to bring the rate of return to capital to the benchmark level. The expansion of the capital stock increases the amount of resources in the economy and generates output growth.

In the following section I discuss the steady state implications of the joint scenario, which includes the adoption of the CET and the Single Market access. Further, I incorporate additional benefits of standardisation. I do not analyse the steady state impact of the customs union, as this scenario was only for illustrative purposes and is not a realistic representation of the outcome of enlargement.

6.1 The enlargement scenario

The enlargement scenario combines two scenarios analysed in previous sections - i.e. the adoption of the CET and reduction of border and standards costs. I will also refer to it as the "base case scenario". The first column of Table 10, where no change in standards and border costs is assumed, presents the steady state welfare effects of the adoption of the CET. The analysis of detailed production, trade and pricing patterns reveals the same story as in the static scenario, with the only exception that the capital stock is allowed to grow or contract to the level that keeps the price of capital at its benchmark value. This magnifies the static welfare effects. The expansion or contraction of the capital stock works as an endowment effect, so that with more resources to be employed larger welfare gains are generated.

Table 10. Welfare effects of the adoption of the CET and the reduction in border and standards costs (equivalent variation as a percent of GDP)

	ACC0	ACC25	ACC50	ACC75	ACC100	ACC0	ACC25	ACC50	ACC75	ACC100
	CRTS					IRTS				
EU15		0.01	0.02	0.02	0.03	0.01	0.02	0.02	0.03	0.03
Austria	-0.005	0.034	0.068	0.105	0.145	-0.004	0.046	0.083	0.126	0.173
Rest of the EU	-0.006	0.007	0.012	0.017	0.02	0.002	0.012	0.015	0.02	0.024
France	0.004	0.014	0.009	0.001	-0.006	0.019	0.023	0.012	0.001	-0.01
Germany	-0.023	-0.002	0.012	0.026	0.041	-0.017	0.003	0.017	0.033	0.05
Great Britain	0.013	0.02	0.018	0.017	0.014	0.028	0.031	0.026	0.023	0.018
Greece	-0.004	0.008	0.009	0.003	0.006	-0.003	-0.001	0.008	0.005	0.008
Portugal	-0.005	-0.006	-0.005	-0.003	-0.002	-0.004	-0.005	-0.004	-0.003	-0.002
Spain	0.005	0.013	0.012	0.008	0.003	0.018	0.023	0.015	0.009	0.003
Italy	0.017	0.038	0.042	0.044	0.046	0.048	0.063	0.061	0.062	0.063
Netherlands	-0.011	0.004	0.011	0.017	0.023	-0.004	0.011	0.015	0.021	0.027
Hungary	**0.437**	**1.762**	**3.17**	**4.686**	**6.317**	**0.554**	**2.015**	**3.528**	**5.189**	**6.974**
Poland	**0.286**	**0.906**	**1.563**	**2.26**	**2.999**	**0.386**	**1.082**	**1.808**	**2.583**	**3.407**
CEECs-5	-0.004	-0.034	-0.062	-0.091	-0.121	-0.004	-0.015	-0.066	-0.096	-0.128
FSU	0.01	0.011	0.004	0.003	-0.009	0.016	0.011	0.005	-0.004	-0.014
ROW	0.07	0.074	0.063	0.05	0.037	0.088	0.084	0.067	0.052	0.035

ACC25 – 25% reduction in border and standards costs
ACC100 – 100% reduction in border and standards costs
Source: Model simulations.

The welfare and output effects of full abolition of standards and border costs and adoption of the CET represent an upper bound of possible implications of Single Market enlargement. As already discussed above the full abolition of "sand in the gears" did not materialise in the case of the EU and is not a realistic assumption. According to my model, the upper limit of benefits amounts to a sizeable 7% of GDP in Hungary and to 3.4% in Poland. The CEECs left outside the

enlarged Union and the FSU lose slightly due to trade diversion. The impact on the EU is positive, except for Portugal. The economies which trade most with Hungary and Poland (i.e. Austria, Italy and Germany) record small welfare gains (0.17%, 0.06% and 0.05% respectively). Portugal experiences a negligible welfare loss. Portugal specialises in exports of similar products as Poland and Hungary, so better access to the EU market for the new member states leads to reduction of demand for Portuguese goods.

Table 11. Output changes resulting from a 50% reduction and full abolition of border and standards costs and adoption of the CET (IRTS scenario)

	ACC50				ACC100			
	Hungary	**Poland**	**Hungary**	**Poland**	**Austria**	**France**	**Germany**	**Italy**
Agriculture	-0.2	-1.4	0.3	-1	-0.1			
Raw materials	-0.5	0.4	-1.7	0.2	0.2	0.5	0.2	0.2
Food	2.7	-0.3	4.9	0.6			-0.1	
Textiles	1.1	3.6	2.4	7.1	0.8		0.4	
Clothing	0.7	7.3	1.2	13.8	0.6	-0.2	-0.6	-0.1
Leather	0.4	-1.7	1.4	0.4	-0.3		-0.3	-0.2
Wood	2	5.3	4	9	-0.4	-0.1	-0.2	-0.1
Paper	0.7	-0.3	1.6	-0.5	0.4		0.2	0.1
Petroleum	2.3	-0.4	4.4	-0.4	0.1		0.1	
Chemicals	0.5	-0.4	1.3	-0.5	0.7	0.1	0.3	0.1
Non-metallic Min.	1.1	0.7	1.7	0.8	0.3	0.1	0.2	0.1
Iron, steel	5.6	2.7	11.3	3.8	-0.1	-0.2		0.2
Other metals	7.3	6.4	15.4	9.5	0.8	-0.1	0.1	0.5
Metal products	3.9	1.5	8.1	3.3	0.1	-0.2		0.3
Motor vehicles	23.1	9.6	48.1	19.5	-0.4	-0.4	-0.1	-0.1
Other transport equipment	12.7	1.5	26.3	4.7	1.1	0.2	0.5	0.4
Electronics	24.1	5.4	50.3	13.4	2.2	-0.2	-0.2	-0.1
Machinery n.e.c.	15.2	2.5	30.3	5.4	0.2	-0.1		0.3
Manufacturing n.e.c.	0.7	-0.3	2	1	0.1			0.2
Utilities	1.9	1.1	3.8	2.1	0.1			0.1
Construction	4.1	2	7.9	3.7	0.1		0.1	0.1
Trade	2.6	1.5	5.1	2.9	0.1			0.1
Transport	1.3	1.8	2	2.1	-0.2		-0.1	
Financial services	2.4	1	4.7	1.9	0.1			0.1
Public administration	1.6	0.5	3.3	1.1	0.2			

Source: Model simulations.

The sectoral implications of a 50% reduction and full elimination of border and standards costs and adoption of the CET are presented in Table 11. The pattern of results is similar to the static scenario of the Single Market access (Table 8). However, changes in output are magnified. Again in Poland and Hungary, sectors gaining most from accession include Motor Vehicles, Electronic Equipment, Other Metals, Textiles and Clothing. When border and standards costs are halved output of Electronic Equipment and Motor Vehicles in Hungary expands by 24% and 23% respectively. In Poland the production of Motor Vehicles increases by almost 10%, while production of Clothing expands by 7%.

The impact on production in the remaining regions never reaches 1% of the pre-accession output level even in case of full elimination of border and standard costs. In this scenario Austria, France, Germany and the CEECs-5 record a small fall in production of Motor Vehicles and Clothing as a result of expansion of these sectors in Poland and Hungary. However, the output of selected sectors such as Electronic Equipment, Other Transport Equipment and Non-Ferrous Metals increases in Austria, Germany and Italy.

The full abolition of border and standards costs and the adoption of the CET have serious implications for the trade flows. Following liberalisation, markups in IRTS sectors and prices fall significantly resulting in trade expansion. Total exports of Poland increase by 16%; an increase is recorded in all sectors except for Utilities and Financial Services. Hungarian exports increase by 19% and only Agriculture, Raw Materials and all service sectors record a fall in exports. Imports in all sectors increase significantly. Total imports increase by 14% in Poland and by 18% in Hungary. The trade balance is held fixed in the simulations. There is a clear trade diversion of Polish and Hungarian exports to EU markets away from the ROW. This is because the reduction of border and standards costs does not affect trade with the ROW. The overall increase in imports from the EU is greater than imports from the ROW in the case of Hungary. The opposite is true in the case of Poland. This is mainly because in Poland adoption of the CET leads to a substantial reduction in tariffs on ROW imports, while Hungarian pre-accession tariffs were already quite low.

The impact of enlargement on EU trade is very small. Only Austria and Germany record minor falls in imports and exports with the EU15 of 1% and a similar increase in trade with non-EU15 countries. Also, exports of Italy, Netherlands and Portugal to non-EU15 countries increase by 1%. However, the impact on selected sectors is quite sizeable. For example the exports of Electronic Equipment from Austria rise by 5%, while imports increase by 3%. Imports of Raw Materials increase between 2-4% in Austria, Germany, Spain and Italy. Imports of Motor Vehicles to Greece rise by 13%. Greece increases imports of Motor Vehicles from Poland and Hungary, where enlargement leads to fall in prices and expansion of production. The detailed results on the trade implications of this scenario are presented in Appendix D.

Table 12. Impact of the Single Market on factor rewards (% changes) – IRTS scenario

	ACC50				ACC1000			
	Hungary	**Poland**	**Hungary**	**Poland**	**CEECs-5**	**Austria**	**Germany**	**Italy**
Land	1.3	-1	4.1	0.8	-0.1	0	0	0
Skilled Labour	2.9	1.7	5.7	3.4	-0.1	0.1	0	0.1
Unskilled Labour	3.2	1.7	6.4	3.4	-0.2	0.1	0	0.1
Change in capital stock	4.8	2.2	9.4	4.5	-0.21	0.185	0.035	0.088

Source: Model simulations.

In the steady state scenario when border and standards costs are halved, real wages of unskilled workers increase by 1.7% in Poland and 3.2% in Hungary. The relative wages of unskilled workers rise, as production shifts towards unskilled labour-intensive sectors. The return to land follows changes in the production of agriculture. It rises in Hungary and falls in Poland. As production in several manufacturing capital-intensive sectors expands, the return to capital rises in the static scenario. In the steady state the capital stock is allowed to adjust to bring the price of capital to its benchmark level. The capital stock increases by 4.8% in Hungary and by 2.2% in Poland.

Factor rewards in the EU change by very little. The biggest changes are recorded in Austria and Italy, whose share of trade with the CEECs is significantly above the EU average. The impact on the CEECs-5 is negative, but close to nil.

6.2 The enlargement scenario with increased substitution possibilities

This section looks at the extension of the previous scenario by including additional benefits of standardisation. Standards can be decomposed into uniformity and product quality standards. Both types of standards serve to significantly increase the substitution possibilities of buyers. Uniformity standards enable consumers to use products interchangeably, while quality standards reduce the market power of brand names allowing for greater substitutability among products.

Following the adoption of EU standards and regulations all CEEC producers will be able to sell their products in the enlarged EU. This should improve the diversity of products available to EU consumers. Also with full adoption of the *acquis* the fears of current EU citizens about environmental or social dumping should be greatly reduced. As a result EU consumers are likely to view the products from new member states as increasingly similar to the goods produced within the borders of the EU15. Also, in the CEECs, products imported from the EU15 will be viewed as better substitutes to domestic varieties. This is essentially because the CEEC goods which do not comply yet with the EU standards and regulations will need to change.[6] It has to be born in mind

[6] Some products in the CEECs were granted transition periods during which they do not need to comply with the EU regulations, as long as they are sold only on the domestic market e.g. milk in Poland. However, transition periods were granted only to a limited number of goods.

that this does not necessarily mean that domestic products were seen as worse or better than EU products before accession. However, their characteristics are likely to become more similar when Polish and Hungarian products satisfy the same standards and technical requirements as goods imported from the EU.

Summing up, this scenario assumes that as a result of harmonisation of standards consumers will be able to substitute more easily between products from old and new member states. In the base case scenario consumers are assumed to possess weakly separable utility functions, which allow multiple stage budgeting of their consumption decisions as illustrated in Figure 1. First, consumers choose between different composite goods based on a Cobb-Douglas utility function. Then consumers choose between domestic and imported goods within a given composite, based on a CES sub-utility function. And finally consumers choose between products from different regions based on a CES sub-utility function. In the scenario modelled in this section consumers have a different structure of preferences to reflect the fact that products in the enlarged EU became better substitutes for each other as a result of standardisation. The preference structure is still very similar to that depicted in Figure 1. The major difference is that domestic variety now includes not only the varieties produced in a home country, but all other EU products as well. The elasticities of substitution remain unchanged, but with the inclusion of other EU products in the domestic composite the elasticity of substitution between domestic and other EU products changes from 5 (elasticity of substitution between domestic and imported varieties) to 15 (elasticity of substitution between domestic varieties). I follow the approach of HRT (1994) in modelling the changes in preferences over a continuum where at the limit all EU consumers view domestic and imported EU products as equally substitutable.

The two preference structures discussed above present two extreme views of the demand structure. I choose to model the path towards full recognition of varieties from other EU countries as home varieties as a weighted average of these two approaches. The assumption that 50% of the EU market is integrated means that 50% of EU consumers in each EU country perceive no change in the substitutability of EU varieties, while 50% view EU produced varieties as equally substitutable with home varieties. A similar approach was adopted by HRT (1994), however the major difference is that in HRT (1994) the benchmark level of integration is zero, because it represents the EC before 1992. If indeed the Single Market program led to better substitutability between EU products as postulated in Appendix C, then at the time of enlargement this change in preference structures must already be taken into account.

It seems that full integration is unlikely ever to take place, as there will always be some bias toward domestically produced goods. I assume that the share of standards approved is a good proxy for the level of integration of EU markets in the sense discussed above. By October 1997 the number of standards approved in all EU member states amounted to only 32% of the total number of mandated standards. I expect that further efforts of the EU countries will raise the share of adopted standards to 50% by the time of enlargement. Therefore I assume that in the benchmark the initial level of integration is an arbitrary 50%. The change of preferences does not affect the

benchmark SAMs, but it affects the number of firms and markups in the EU countries. The markups on domestic markets are higher as compared to the base scenario, while markups on foreign markets are lower.

The intuition into how integration affects markups can be gained by the examination of the markup equations derived in Appendix A. The markup for firms from one EU country (r) selling into another EC country (s) in the segmented market situation is denoted m_{rs}^{SEG} and m_{rs}^{INT} in a fully integrated equilibrium. Following equations (44) and (45) in Appendix A the markup under segmented markets is as follows:

$$(1)\quad m_{rs}^{SEG} = \frac{1}{\sigma_{MM}} + \left(\frac{1}{\sigma_{DM}} - \frac{1}{\sigma_{MM}}\right)\frac{\theta_{rs}}{N_r \theta_s^M} + \left(1 - \frac{1}{\sigma_{DM}}\right)\frac{\theta_{rs}}{N_r}$$

and the markup under integrated markets is as follows:

$$(2)\quad m_{ra}^{INT} = \frac{1}{\sigma_{MM}} + \left(\frac{1}{\sigma_{DM}} - \frac{1}{\sigma_{MM}}\right)\frac{\theta_{rs}}{N_r (1 - \theta_s^{EU})} + \left(1 - \frac{1}{\sigma_{DM}}\right)$$

Then the change in markup following greater integration is equal to:

$$(3)\quad m_{rs}^{INT} - m_{rs}^{SEG} = \left(\frac{1}{\sigma_{DD}} - \frac{1}{\sigma_{MM}}\right) + \frac{\theta_{rs}}{N_r}\left[\frac{1}{\theta_s^{EU}}\left(\frac{1}{\sigma_{DM}} - \frac{1}{\sigma_{DD}}\right) - \frac{1}{\theta_s^{M}}\left(\frac{1}{\sigma_{DM}} - \frac{1}{\sigma_{MM}}\right)\right]$$

where

σ_{DD} – elasticity of substitution between varieties supplied by domestic firms

σ_{MM} – elasticity of substitution between products of any two foreign suppliers

σ_{DM} – elasticity of substitution between domestic and imported varieties

N_r – number of firms producing in region r

θ_{rs} – the market share of region r firms in region s

θ_s^{EU} – the market share of supply from the EU in region s

θ_s^{M} – the market share of imports in region s.

When expression (3) is negative the markups will fall relative to the segmented market equilibrium and *ceteris paribus* intra-EU trade will expand. Given our assumption about the values of elasticities (see section 3.3 of Appendix A) the first term in equation (1) is negative (-0.033), but the sign of the second term is ambiguous. The second term will be positive the smaller is θ_s^{EU} in relation to θ_s^{M}, i.e. the smaller the share of EU firms on the domestic market relative to non-EU imports. Given the assumptions about the elasticities of substitution the change in markup is as follows:

(4) $$m_{rs}^{INT} - m_{rs}^{SEG} = -0.033 + \frac{\theta_{rs}}{N_r}\left(\frac{0.133}{\theta_s^{EU}} - \frac{0.1}{\theta_s^{M}}\right)$$

Numerically, I find that the sign of the second term is positive in most cases, but smaller than the first term, so that the overall change in the markup on other EU markets is negative in all cases. The decline in markup is in most cases between 1.5 and 2 percentage points.

The change in markups charged on the domestic market is negative in all cases. Again the difference between integrated and segmented market markups can also be derived using the equations (44) and (45) from Appendix A:

(5) $$m_{rr}^{INT} - m_{rr}^{SEG} = \frac{1}{N_r}\left[\left(\frac{1}{\sigma_{DM}} - \frac{1}{\sigma_{DD}}\right)\left(\frac{\theta_{rr}}{\theta_r^{EU}} - 1\right)\right]$$

The difference between elasticities is positive (0.13), while the second term is positive if $\theta_{rr} > \theta_r^{EU}$, i.e. when the home market share of domestic firms is higher than the share of imports from all EU countries. This is always the case, so the second term is positive and, following integration, markups charged by domestic firms on domestic market increase. In other words when other EU goods are viewed as equally substitutable with domestic goods, the share of domestically produced goods decreases and with falling production markups need to be increased in order to cover fixed costs.

In the enlargement scenario I assume that Poland and Hungary become equally integrated with current EU members, i.e. that 50% of consumers in the old member states view Polish and Hungarian products as equally substitutable with domestic varieties and vice versa. This is in addition to the modelling of the adoption of the CET and elimination of border and standards costs. With market integration the perceived elasticity of demand of EU firms on intra-EU exports increases and price margins on intra-EU trade fall endogenously leading to expansion of intra-EU trade. Firms in CRTS sectors are also affected due to general equilibrium effects of the changing prices in IRTS sectors. When additional benefits of standardisation are assumed, the prices of goods fall even further following accession, so the resulting welfare gains are higher.

Table 13. Welfare effects of enlargement with increased substitution possibilities (equivalent variation as a percent of GDP)

	50% Integration					Enlargement scenario (IRTS)
	ACC0	**ACC25**	**ACC50**	**ACC75**	**ACC100**	**ACC100**
EU15	0.07	0.09	0.12	0.15	0.18	0.03
Austria	0.06	0.101	0.149	0.202	0.265	0.173
Rest of the EU	0.023	0.031	0.04	0.051	0.062	0.024
France	0.019	0.012	0.003	-0.005	-0.015	-0.01
Germany	0.013	0.026	0.042	0.058	0.077	0.05
Great Britain	0.031	0.029	0.028	0.026	0.024	0.018
Greece	0.001	0.004	0.008	0.012	0.016	0.008
Portugal	-0.004	-0.003	-0.003	-0.002	-0.016	-0.002
Spain	0.019	0.016	0.014	0.006	0.009	0.003
Italy	0.079	0.081	0.086	0.09	0.095	0.063
Netherlands	0.024	0.035	0.048	0.062	0.078	0.027
Hungary	**2.997**	**4.617**	**6.417**	**8.413**	**10.632**	**6.974**
Poland	**1.62**	**2.321**	**3.098**	**3.956**	**4.906**	**3.407**
CEECs-5	-0.057	-0.077	-0.097	-0.117	-0.136	-0.128
FSU	0.005	0.006	-0.004	-0.009	-0.013	-0.014
ROW	0.072	0.06	0.049	0.036	0.023	0.035

Source: model simulations – see text.

The gains from standardisation are substantial. When domestic treatment of Polish and Hungarian products by half of the EU consumers and vice versa is allowed, the upper bound of welfare gains rises by 1.5 percentage points in Poland, by 3.6 percentage points in Hungary and by 0.15 percentage points in the EU. In all countries and regions the welfare gains or losses are magnified relative to the base case scenario, but the pattern of results remains unchanged.

When standards and border costs are halved, the prices of most manufacturing products fall. The highest price reduction in Poland is recorded in Wearing Apparel and Leather (-3%). In Hungary the greatest price cuts are expected in Motor Vehicles (-4.5%), Machinery and Equipment (-3.5%), as well as Electronic Equipment and Other transport equipment (around -3%). Similar changes in prices of those sectors are expected to materialise in Poland.

The simulated changes in trade flows and output are at least twice as big as in the enlargement scenario. Table 14 displays the implications of the present scenario for output. It is interesting to note that even huge shifts in production in the CEECs do not lead to any significant changes in output of the EU.

Table 14. Output changes in enlargement scenario with increased substitution possibilities (IRTS scenario)

	ACC50				ACC100			
	Hungary	**Poland**	**Hungary**	**Poland**	**Austria**	**France**	**Germany**	**Portugal**
Agriculture	-0.6	-1.5	-1.1	-1.9	0	0.1	0.1	0.1
Raw materials	-2	-0.1	-3.3	-0.3	-0.2	0.7	0.2	1.2
Food	5.5	0.2	7.6	0.5	-0.3	-0.2	0.1	0
Textiles	-4.2	4.6	-5	8	0.9	0.2	0.6	-0.1
Clothing	-6.3	8.5	-8.1	16.4	1.3	-0.2	-0.8	-0.3
Leather	-6.8	-1	-7.9	0.2	0	0.1	-0.1	0.2
Wood	-0.8	5.2	-0.6	9.9	-0.4	-0.1	-0.4	0
Paper	-3.1	-3.2	-4.3	-5	0.9	0.1	0.5	0.1
Petroleum	3.8	-3.7	6.2	-4.7	-0.5	0.1	0.2	0
Chemicals	-3.5	-4.1	-4.9	-5.9	1.2	0.2	0.6	0
Non-metallic Min.	-1	-1.1	-3.1	-2.4	0.5	0.2	0.3	0.3
Iron, steel	11.3	4.9	17.3	6.1	0.2	-0.2	0.2	-0.4
Other metals	17.6	13.7	27.8	18	1.4	-0.7	-0.1	-0.5
Metal products	6.2	4	8.8	5.7	0.6	-0.3	-0.2	0.5
Motor vehicles	68.4	28.1	117.4	47.9	-0.8	-0.8	-0.6	-1.5
Other transport	27.8	6.4	47.2	11.2	2.2	0.1	0.5	0.1
Electronics	46.4	11.9	88.6	24.3	1.8	-0.6	-0.5	-0.4
Machinery n.e.c.	26.1	4.2	46.8	7.9	0.6	-0.2	0.1	-0.1
Manufacturing n.e.c.	-3.1	-0.3	-5.2	-0.1	0.1	0.2	0.2	0
Utilities	3.2	2	5.1	3.2	0.2	0	0.1	0
Construction	7.5	3.4	12.1	5.4	0.2	0	0.1	0
Trade	5.4	2.8	9.1	4.5	0.2	0	0	0
Transport	4.2	4.8	5	5.5	-0.2	0	0.1	0
Financial services	3.7	1.3	6	2	0.1	0	0.1	0.1
Public administration	4	1.1	6.7	1.9	0.2	0	0.1	0

Source: Model simulations.

When we allow for greater substitution between domestic and imported goods, the expansion of capital stock is much higher than in the enlargement scenario. In case of full abolition of border and standards costs it amounts to 14.6% in Hungary and 6.1% in Poland. The wages of unskilled workers improve in real terms by 9.3% in Hungary and 4.7% in Poland. Changes in wages of other countries are negative in some cases, but negligible. This is to be expected, as the impact of enlargement on output of the EU is very small.

7. Sensitivity analysis

This section is dedicated to the sensitivity analysis of the main results of the model - i.e. the welfare implications of enlargement in the steady state (base case) scenario. I look at the implications of two variations in the parameters of the model, a change in the nature of competition in IRTS sectors and two changes in the assumptions about the costs of harmonisation of standards. The first scenario looks at the adoption of the CET and Single Market access using the middle value for estimated cost disadvantage ratio (CDR - see section 3.5 of Appendix A). In the next scenario the assumed values for the elasticities of substitution are halved. The third simulation changes the nature of competition to firm-level competition as depicted in Figure 2. The final two scenarios assume that in order to comply with EU standards and regulations producers in Poland and Hungary are forced to make additional investments equivalent to 0.5% (scenario 4) and 1% (scenario 5) of value added.

In case of the first three scenarios I re-calibrate the benchmark equilibrium to the new parameters, as well as using them in the counterfactual simulations. This means that the Hicksian equivalent variation measure of welfare is well defined, as the new structure of demand reproduces the initial benchmark equilibrium without any changes. Given prices, income and quantity choices the initial data point can be calibrated as an optimum for any value of the elasticity of substitution. The changes of elasticities in sensitivity analysis alter the curvature of the utility function in benchmark equilibrium and affect the results of counterfactual scenarios, but they do not change the initial optimum point of consumption.

The first scenario assumes much greater unrealised economies of scale. The differences are significant, as for example the assumed CDRs increase from 8 to 14 in the Other Transportation Equipment or from 5 to 9 in Non-Metallic Minerals as compared to the base case scenario. With higher unrealised economies of scale the calibrated number of firms is much smaller and markups charged by them are higher. The liberalisation of trade leads to a stronger increase in competition and more significant fall in prices than in the base case scenario, as the slope of average cost curve is steeper in the medium CDR scenario. The greater the absolute value of a decline in the markup the larger will be the welfare benefits from rationalisation and consumption efficiency. The results of the experiment with medium values of CDR are presented in column 2 of Table 15. Indeed, all regions record much higher welfare gains as compared to the base case scenario. The additional gain for the EU amounts to 0.4 percentage points and to 0.8 and 0.4 percentage points in case of Hungary and Poland respectively. Countries with high shares of trade with Poland and Hungary such as Italy, Germany, Netherlands and France gain between 0.4-0.6% of GDP. In this scenario some EU countries gain more than Poland. This is mainly a feature of modelling, as we assume that further harmonisation of law between the current EU member states leads to reduction of border and standard costs in trade between themselves. The impact of lowering of trade costs within EU15 has greater impact on prices and welfare under the assumption of medium CDR than in the base case scenario.

In the second scenario the elasticities of substitution are scaled down by 50%, so that the elasticity of substitution between domestic varieties is equal to 7.5, between imported varieties to 5 and between domestic and imported goods to 2.5. With lower values of elasticities, the benchmark markups are almost twice as high as in the base case scenario and changes in prices following enlargement are smaller. This is also the case of changes in output, which in case of greater product differentiation tend to be lower. Smaller changes in prices and output are associated with lower welfare gains, as indicated in column 3 of Table 15. The welfare gains for Hungary and for Poland are 2.1 and 0.6 percentage points lower than in the base case. Although the elasticities of substitution are crucial for the results, I cannot base the modelling effort on estimates of those elasticities for Europe or the CEECs, as to my best knowledge there are no estimates based on the demand structure used in this model. It is important to note that the results of HRT (1994) were very close to the results of other studies using very dissimilar methodologies to evaluate the impact of Europe 1992 (see HRT, 1994, p. 33-39). This in my view supports their choice of methodology and assumptions about the crucial parameters. Using the assumptions about the elasticities of substitution employed by HRT (1994) allows also for comparisons between the impact of accession to the Single Market by Poland and Hungary to the impact of the creation of the Single Market in 1992.

The third scenario looks at the implications of firm-level competition, which is independent of country of origin. This amounts to choosing the same value for the elasticity of substitution between varieties supplied by domestic firms (σ_{DD}), the elasticity of substitution between products of any two foreign suppliers (σ_{MM}) and the elasticity of substitution between domestic and imported varieties (σ_{DM}). In this scenario the value chosen is equal to the elasticity of substitution between varieties supplied by domestic firms from the base case, i.e. 15. This scenario is similar to the market integration scenario, except that now products of all (not only EU) firms are viewed as equally substitutable with domestic varieties. In a new benchmark domestic firms charge higher markups on the domestic market. At the same time there is an increase in the perceived elasticity of demand on the home market. Therefore foreign markets induce domestic firms to charge lower markups. Fiercer competition results in bigger changes in prices and output following enlargement and greater welfare gains. Hungary gains an additional 1 percentage point, while welfare gains for Poland amount to only 0.12%.

Table 15. Welfare effects of enlargement under various assumptions – AC100, IRTS steady state scenarios (equivalent variation as a percent of GDP)

	Base case (irts)	Medium cdr	Lower elasticties of substitution	Firm level competition	Costs of standards for domestic market	
					0.5%	1%
	(1)	(2)	(3)	(4)	(5)	(6)
EU15	0.03	0.41	0.04	0.06	0.03	0.03
Austria	0.173	0.233	0.164	0.219	0.171	0.167
Rest of the EU	0.024	0.324	0.031	0.063	0.024	0.023

France	-0.01	0.484	0.012	0.023	-0.009	-0.011
Germany	0.05	0.42	0.06	0.064	0.05	0.048
Great Britain	0.018	0.269	0.026	0.038	0.018	0.016
Greece	0.008	0.172	0.008	0.022	0.008	0.008
Portugal	-0.002	0.165	0.001	-0.003	-0.003	-0.003
Spain	0.003	0.381	0.018	0.032	0.003	0.003
Italy	0.063	0.607	0.073	0.105	0.062	0.06
Netherlands	0.027	0.445	0.04	0.078	0.027	0.018
Hungary	**6.974**	**7.778**	**4.863**	**8.059**	**6.292**	**5.629**
Poland	**3.407**	**3.791**	**2.763**	**3.527**	**2.549**	**1.714**
CEECs-5	-0.128	0.142	-0.088	-0.076	-0.127	-0.126
FSU	-0.014	0.242	0.007	0.002	-0.017	-0.02
ROW	0.035	0.358	0.043	0.052	0.035	0.033

Source: model simulations – see text.

Further I look at two more experiments. In the earlier modelling of the Single Market access I assume that as soon as products certified for use in Poland and Hungary will be accepted for sale in the EU the costs of testing and certification of goods for exports to the EU will fall. However, there is a possibility that more stringent than local regulations will impose additional costs on production for the domestic markets of the CEECs. The standard costs for the EU countries before completion of the Single Market oscillated between 0 and 2%. The estimated costs of compliance with EU regulations in Poland amounted to 0.5%-2% of annual sales (IKCHZ, 2002).[7] Therefore I look at two scenarios where the additional value added in production for the domestic market amounts to 0.5% and 1% of the initial value added. As expected the welfare implications of additional costs of production for the domestic market are negative and significant. In the case of the 1% increase in value added (column 6 of Table 15) the welfare gain of Poland is almost halved, while Hungary loses 1.3 percentage points relative to the base case. Since all of the firms exporting to the EU and firms with relatively new production technologies already comply with EU standards and regulations, it seems that the likely impact on the rise of costs of production for the domestic market will be in the rage of 0-0.5%. It therefore should not have a big impact on the welfare implications of enlargement.

Overall the level of unrealised economies of scale or the nature of competition do not affect the welfare implications of enlargement very much. However, one has to bear in mind that the parameters employed in the modelling work such that the elasticities of substitution in demand are important determinants of the results. This points to the need for more research on the specific demand functions and their parameters in the CEECs.

[7] Unfortunately, this study covers only a very small sample of firms (25 of them provided the costs of compliance), so it cannot be used to formulate sector specific assumptions regarding the cost of compliance with EU regulations.

8. Discussion of the results

The results of this paper are not directly comparable to studies by Brown et al. (1995) and Baldwin, Francois and Portes (BFP 1995) and Francois (1998), as all of these studies include the Europe Agreements as part of the enlargement scenario. In addition, these studies had the 1992 database as the benchmark, when trade barriers between Poland and the EU were very high. This significantly increases the gains from accession. I cite the results of those studies only as a reference.

The impact of Single Market access can be compared to the Brown et al. (1995) scenario D, where all tariff barriers and non-tariff barriers to trade in industrial goods are removed. The authors' estimates indicate that the gains for Poland and Hungary amount to about 5.6 and 6.8% of GDP.

BFP (1997) and Francois (1998) study the impact of the customs union, adoption of the CET and across-the-board reduction of transaction costs of trade by 10%. According to their results the CEECs gain 1% of GDP due to static efficiency effect and an additional 11.5% due to pro-competitive effect in IRTS sectors. The impact on the EU is very small as the sum of these two effects amounts to 0.2% of benchmark GDP.

In the "less conservative" scenario BFP (1997) and Francois (1998) assume that in the long-run the investment risk in the CEECs falls to the level of the investment risk of Portugal as a result of the EU membership. This is equivalent to a drop in the relative return on investment in this region of 15%. Reduced investment risk induces greater investment in the region. The accumulation effect constitutes an additional source of welfare gain, which is quite substantial for the CEECs. It amounts to almost 20% of the benchmark GDP. This relatively high number is due to a predicted increase of capital stock in the CEECs of 68%. I conducted a similar experiment by looking at the implications of a 15% increase in the rate of return to capital in Poland and Hungary in addition to the adoption of the CET and complete abolition of standards and border costs. The results are of similar order of magnitude as those obtained by BFP (1997). The welfare in CEECs-7 increases by 18.8%, while in my model Polish welfare increases by 19.4% and Hungarian by 32.6%. This is associated with an increase of the capital stock of 47.5% in Poland and 68.5% in Hungary, compared to 68% estimated by BFP (1997) for the CEECs-7. This exercise serves as a robustness test for my model. It is reassuring that although BFP (1997) include the impact of EAs and use different model and earlier benchmark data, the orders of magnitude of results are similar.

Table 16. Comparison of welfare implications of enlargement with other general equilibrium studies

	Base case (IRTS)	Reduced investment risk	Lejour, de Mooij, Nahuis (2001)			Baldwin, Francois, Portes (1997)	
	Equivalent variation as a % of GDP		Volume of GDP (% change)			Volume of GDP (% change)	
			Customs Union	Single Market access*	Labour migration	Conservative case**	Less conservative case***
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
EU15	0.03	0.03	0	0.1	0.6	0.2	0.2
CEECs-7			2.5	5.3	-1.8	1.5	18.8
Hungary	7.0	32.6	1.9	9	-1.3		
Poland	3.4	19.4	4.3	5.8	-1.4		
CEECs-5	-0.1	-0.1	1	3.4	-2.3		
FSU	0.0	0.1	0	0	0	1.1	0.6
ROW	0.0	0.0	0	0	0		

* Elimination of estimated technical barriers to trade.
** Customs union with CAP production in the EU kept at the pre-enlargement level plus 10% reduction in real costs of trade
*** In addition to the above, risk premium of investment in the CEECs is reduced by 15%.

The results of this study are directly comparable to the results of Lejour, de Mooij and Nahuis (LMN 2001), as translation of the enlargement into modelling assumptions is similar. There are two significant differences between my analysis and the LMN study. The first difference is the modelling of the Single Market access, as LMN (2001) estimate the tariff equivalent of the barriers to trade between the EU and the CEECs with the use of gravity equations. Secondly, my analysis is based on lower protection levels in trade between Poland, Hungary and the EU, while the above authors employ the original GTAP v. 5 protection data. As a result LMN's implications of accession also include the benefits stemming from the Europe Agreements. There are also some differences in the structure of the model used in this study and in LMN (2001). In the latter study all sectors are perfectly competitive and the modelling of capital market is different. The WorldScan model employed by LMN (2001) includes a portfolio mechanism in which capital owners distribute their investments over regions depending on the rates of return and the preferences for assets diversification.

According to LMN's study the welfare implications of Single Market access amount to 9% of GDP for Hungary and 5.8% for Poland and between 0% and 0.1% for the EU. My results indicate that a steady state welfare implications of full abolition of standards and border costs amount to 7% for Hungary and 3.4% for Poland and 0% to 0.17% in the EU. Although these latter numbers also include the modelling of adoption of CET, the welfare contribution of this effect for Poland and Hungary is around 0.4-0.5%. Therefore the estimated welfare changes of my study are significantly smaller than those of LMN (2001). This is mainly due to lower protection data employed in my

study. The simulations not reported here show that my results become very close to LMN's results when I use the original GTAP protection levels. Therefore mainly the data and not the methodology are responsible for the differences in results between those two studies.

The sectoral effects of Single Market access of LMN (2001) also display a similar pattern to the results of this study. However, again the estimated changes in output are smaller according to my estimates. The direction of changes in output is consistent between those two studies, with only few exceptions. LMN also expect large increases of output in Transport Equipment and Electronic Equipment, Textiles, Leather, Machinery Equipment in Hungary and Poland. The results for other regions also display a high degree of similarity. The fact that sectoral results are similar despite significant differences in construction of the modelling exercise is very reassuring. It suggests that different ways of capturing Single Market access show a consistent picture of possible significant welfare gains for the acceding countries and modest welfare gains or negligible losses of welfare in the EU. The exact estimates of the welfare gains are very sensitive to the benchmark protection levels and I believe that the tariff data employed in my study constitute a better representation of the protection at the time of accession.

9. Conclusions

This paper looks at the implications of Eastern EU enlargement with the focus on Single Market access. It differs from previous studies in several respects. Firstly, I create a benchmark set of social accounting matrices at the time of accession by incorporating the provisions of the preferential trade agreements between Poland, Hungary and the EU and the UR commitments. Therefore, I am able to avoid the inclusion of Europe Agreements as part of the accession scenario. Secondly, the Single Market access is modelled explicitly. The modelling assumptions regarding the reduction of costs of crossing the border and compliance with foreign regulations and standards are based on the literature on the completion of the Single Market in Europe. Finally, the paper includes a thorough sensitivity analysis regarding the main parameters of the model and modelling assumptions.

The results of this study suggest that Eastern EU enlargement will be beneficial to the new members, while most EU countries will record minor welfare gains. Poland is expected to gain 3.4% of GDP, while Hungary almost 7%. The new members will experience production increases across almost all sectors, while the impact on EU production in some sectors is negative, but very small. In Poland and Hungary real wages rise, with wages of unskilled workers increasing at a faster pace than wages of skilled workers. The welfare implications of accession are smaller than compared to other studies on this subject. Lejour, de Mooij and Nahuis (2001) find that the gains from the Single Market are equivalent to 9% of GDP in Hungary and 5.8% in Poland. Despite significant differences in methodology, the main reason for divergence of the results is that LMN (2001) employ higher trade protection data, which does not incorporate provisions of the Europe Agreements and other trade policy changes.

This study focuses on the impact of trade liberalisation and reduction of technical barriers to trade. A complete analysis of the impact of enlargement on existing and prospective members should clearly also include the implications of accession to the CAP and transfers from the EU budget such as Structural Funds.

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